FACTS ON FILE

EMSP

Environmental Management Science Program

Project Highlights

The Environmental Management Science Program (EMSP) is funding basic research projects focused on solving the most difficult problems that threaten the closure plans of DOE sites. This fact sheet highlights just one.

Design and Synthesis of the Next Generation of Crown Ethers for Waste Separations: An Inter-Laboratory Comprehensive Proposal

This project is combining molecular modeling and sophisticated synthesis techniques to provide a new generation of crown ethers for metal ion separation. It consists of three inter-dependent projects dealing with (1) molecular mechanics and ligand design, (2) solvent-extraction properties, and (3) resin-immobilized crowns. Target problems include Li^{+} ions leaching from burial sites at Oak Ridge and ^{90}Sr and ^{137}Cs contaminating high-level wastes at DOE tank waste storage sites. If high manufacturing costs can be overcome, the project has significant near-term deployment potential and many potential applications outside of EM.

Locations: Oak Ridge National Laboratory, Argonne National Laboratory, University of Tennessee, Argonne National Laboratory–East

Year of Award: 1996

Amount of Award: $1,920, 000

Office of Environmental Management (EM) Problem Areas: High Level Waste (primary), Mixed Waste

Office of Science (SC) Scientific Category/Sub-Category: Separations Chemistry/Ligand Design and Ion Exchange

Research Value/Impact: A notable accomplishment in the past year was the development of improved syntheses of calix[4]arene-biscrown ethers and bis-alkyloxy calix[4]arene-crown ethers. Resulting lower costs for these important extractants directly benefit the development of processes for cesium removal from tank waste.

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More Information on the Web:
http://www.em.doe.gov/science or
http://www.id.doe.gov/emsystems/emsp